

What is claimed is

1. An imaging apparatus comprising:
a solid-state imaging means having a charge multiplying section for multiplying signal charges obtained through imaging by each of the pixels of said imaging means having a full well size equivalent to $1/M$ of the number of electrons corresponding to a maximum amount of light which may be received by the individual pixel determined by the technical specifications of said apparatus; and
10 a reading means for reading out said signal charges from said solid-state imaging means N times in a predetermined time period,

wherein said apparatus is adapted to satisfy the following relation:

$$15 \quad nd \cdot (1 - 1/M) > nr^2 \cdot (N^2 - 1)$$

where nd is the dark noise, and nr is the readout noise when signal charges are read out once in said predetermined time period from a reference solid-state imaging device with each of the pixels having a full well size equivalent to said number 20 of electrons.

2. An imaging apparatus according to claim 1, wherein said apparatus is further adapted to satisfy the following relation:

$$Nr^2/nd = 1/(2NM^2)$$

- 25 3. An imaging apparatus according to claim 1, wherein said solid-state imaging device is a frame transfer CCD imaging

device.

4. An image obtaining apparatus comprising:

a irradiation means for guiding illumination light to an area under test, and irradiating said light thereon; and

5 an imaging apparatus of claim 1 for picking up an optical image originating from said area by the irradiation of said illumination light from said irradiation means.

10 5. An image obtaining apparatus according to claim 4, wherein said apparatus takes the form of an endoscope having an insertion section comprising a part or whole of said irradiation means and imaging apparatus to be inserted into a living body.

15 6. An image obtaining apparatus according to claim 5, wherein said solid-state imaging device is provided at the leading end of said insertion section.

7. An image obtaining apparatus according to claim 6, wherein said solid-state imaging device has a mosaic filter comprising microscopic band-pass filter elements combined in mosaic.

20 8. An image obtaining apparatus according to claim 4, wherein said illumination light comprises R-light, G-light, B-light, IR-light and excitation light.

25 9. An image obtaining apparatus according to claim 8, wherein said irradiation means is a means for obtaining said R-light, G-light, B-light, IR-light and excitation light by passing white light through a rotary filter having filter

elements that pass said light components having the wavelength band of R, G, B, IR, and excitation light respectively.

10. An image obtaining apparatus according to claim 9, wherein said irradiation means has a rotating means for 5 rotating said rotary filter such that each of said filter elements passes each of said light components for a time corresponding to a time for a single frame in a TV frame rate.